Location performance of the Greek National Seismic Network: an evaluation by the SNES method

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Seismic networks are powerful tools for understanding the state of seismo-tectonic processes taking place in a region. Their numerous applications, from monitoring seismicity to characterizing seismogenic volumes, make seismic networks essential tools for the seismic risk assessment. Appropriately structured seismic network may also be a valuable tool for the study of deep geological structures through seismic tomography. The ability to detect small and medium sized events requires a seismic network with sufficient number of low noise stations that are optimally distributed. It is, therefore, important to assess existing capabilities of a seismic network, to identify seismic areas that are not adequately covered, and to further ascertain measures for the network improvement.

Greece, is the most seismically active region in the whole Mediterranean and in the whole West Eurasia. Seismicity is associated with the collision between the Eurasian and the African lithospheric plates. Regional seismicity in Greece is monitored by the Greek National Seismic Network that composed by about 120 seismic stations.

In this poster we will evaluate earthquake location performance of the Greece National Seismic Network though SNES (Seismic Networks Evaluation through Simulation) method. The SNES method gives, as function of magnitude, hypocentral depth and confidence level, the spatial distribution of: number of active stations in the earthquake location, azimuthal gaps and confidence intervals in hypocentral parameters regarding both the geometry and noisiness of the seismic network and the use of an inadequate velocity model.

In particular, through SNES we have identified high and low seismic noise areas of Greece National Seismic Network. Through statistical analysis of P and S residual times we have assessed validity of velocity models used in earthquake location routines and estimate an empirical law that link travel time residual time variance to the hypocentral distance.

Finally, from analysis of produced SNES maps, we will identify regions in Greece where it may be opportune to improve the existing seismic network.